

Probability

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Date:

42 prob.

1. There are 15 M&M's in a dish: 4 yellow, 3 green, 5 brown, 2 red, and 1 orange.

- a. $P(\text{yellow}) = \frac{4}{15}$ d. $P(\text{green}) = \frac{3}{15} = \frac{1}{5}$
b. $P(\text{red}) = \frac{2}{15}$ e. $P(\text{brown}) = \frac{5}{15} = \frac{1}{3}$
c. $P(\text{orange}) = \frac{1}{15}$ f. $P(\text{blue}) = 0$

2. If you roll a die, find the following probabilities:

- a. $P(3) = \frac{1}{6}$ d. $P(\text{even \#}) = \frac{3}{6} = \frac{1}{2}$
b. $P(4) = \frac{1}{6}$ e. $P(7) = 0$
c. $P(1) = \frac{1}{6}$ f. $P(\text{odd \#}) = \frac{3}{6} = \frac{1}{2}$

3. Using the twelve months of the year, find:

- a. $P(\text{month ends in 'ber'}) = \frac{4}{12} = \frac{1}{3}$ (Sept. Oct. Nov. Dec.)
b. $P(\text{month begins with 'J'}) = \frac{3}{12} = \frac{1}{4}$ (Jan. June. July)
c. $P(\text{month has four letters}) = \frac{2}{12} = \frac{1}{6}$ (June, July)
d. $P(\text{month begins with 'W'}) = 0$

Find the number of possible outcomes for the following.

4. rolling a die 6 (1-6)

5. spinning the spinner to the right 4



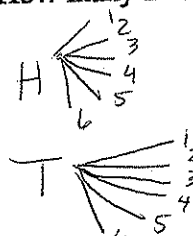
6. tossing a coin 2 (H, T)

7. rolling a die then tossing a coin 12
6 x 2

8. There are 3 different types of TV's, 4 different types of DVD players and 10 different types of remotes. How many different combinations can you make? 120 $4 \cdot 3 \cdot 10$

9. There are 4 main meals, 6 desserts, and 8 veggies available. How many different meals can you make? 192 $4 \cdot 6 \cdot 8$

10. Draw a tree diagram of flipping a coin, then rolling a die.



Find the probability of the following. Assume you are taking out one marble at a time.

There are 7 green marbles, 5 red, and 2 yellow, and 1 blue. 15 total

With replacement

Without Replacement

11. $P(R \text{ and } B) = \frac{5}{15} \times \frac{1}{15} = \frac{1}{45}$

12. $\frac{5}{15} \times \frac{1}{14} = \frac{1}{42}$

13. $P(B \text{ and } B) = \frac{1}{15} \times \frac{1}{15} = \frac{1}{225}$

14. $\frac{1}{15} \times \frac{0}{14} = 0$

15. $P(Y \text{ or } G) = \frac{2}{15} + \frac{7}{15} = \frac{9}{15} = \frac{3}{5}$

16. $\frac{2}{15} + \frac{7}{14} = \frac{2}{15} + \frac{1}{2} = \frac{4}{30} + \frac{15}{30} = \frac{19}{30}$

17. $P(Y \text{ and } Y) = \frac{2}{15} \times \frac{2}{15} = \frac{4}{225}$

18. $\frac{2}{15} \times \frac{1}{14} = \frac{1}{105}$

Evaluate the following.

19. ${}_6P_3 = \frac{6 \cdot 5 \cdot 4}{1 \cdot 2 \cdot 3} = 120$

20. ${}_5C_4 = \frac{5 \cdot 4 \cdot 3 \cdot 2}{4 \cdot 3 \cdot 2 \cdot 1} = 5$

21. $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

Decide whether the following is a combination or permutation, then solve.

22. How many ways are there to choose 7 out of 12 players? ${}_{12}C_7 = \frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6}{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 792$

23. In how many ways can 6 people stand in line to get pizza? $6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 720$

24. I have a combination lock. It needs 3 numbers to open it. There are 20 numbers to choose from, and no two numbers can be the same. How many possibilities are there? ${}_{20}P_3 = 20 \cdot 19 \cdot 18 = 6840$

25. We are going to an amusement park. There are ten rides to choose from. In how many different orders can we ride 4 of them? ${}_{10}P_4 = 10 \cdot 9 \cdot 8 \cdot 7 = 5040$

26. You need to do 5 of 7 chores. How many different groups of 5 chores can be done? ${}_{7}C_5 = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 21$

Predict the number of times the event will occur if the experiment is performed 400 times.

27. Toss a coin and get a head. $P(H) = \frac{1}{2}$ $\frac{1}{2} \times 400 = 200 \text{ times}$

28. Spin a spinner with the 12 months marked and get a month that starts with a "J". $P(\text{Jan, June, July}) = \frac{3}{12} = \frac{1}{4}$ $\frac{1}{4} \times \frac{400}{1} = 100 \text{ times}$

29. Toss two dice and get two 4's. $P(4,4) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$ $\frac{1}{36} \times \frac{400}{1} = 11 \text{ times}$ 11.1